FLOW SENSOR

The invention relates to a flow sensor with a tube through which the medium to be measured flows and a housing comprising a lower shell and an upper shell and receiving measuring electronics with unions provided with a flow bore communicating with the tube and which are received in recesses made in facing sides of the lower and upper shells.

Numerous different designs of such flow sensors are known.

DE 100 62 609 A1 discloses a flow sensor having the features of the preamble. In the case of said flow sensor the unions are constructed in one piece with the tube, which can be disadvantageous for certain applications, because mechanical stresses, which can emanate from the housing or the unions, are transmitted to the tube.

The problem of the invention is to provide a flow sensor, in which mechanical stresses emanating from the housing or unions are not transmittable to the tube.

According to the invention this problem is solved in that the union has an outer part, an inner part and a central piece, the inner part of both unions is provided with a blind hole concentric to the flow bore and in which are elastically mounted the ends of the tube, and the central piece is constructed cylindrically with a reduced diameter compared with the parts of the union and the lower shell and the upper shell are in each case provided with a semicylindrical portion receiving the central piece of the union.

One of the parts of the unions and the areas of the facing sides of the lower and upper shells receiving the same must not have a cylindrical construction.

Preferably the ends of the tube are mounted in the inner part of each of the unions by at least one first O-ring, sealing against the tube, located in a circumferential groove in the wall of the bore.

A preferred embodiment is characterized by at least one second O-ring, sealing against the central piece of the union made in the portion of the recesses receiving the central pieces of the unions.

The unions can be made from a plastics material and the inner part of the unions can in each case be embraced by a shape-stabilizing, metal ring. A pin used to prevent turning and engaging in the wall of the lower shell or cover can be guided through the inner part of the unions.

The invention is described hereinafter relative to the attached drawings,

wherein show:

Fig. 1 A lateral sectional view of a first embodiment.

Fig. 2 A plan view of a second embodiment with the upper shell removed.

The flow sensor has a tube 2 through which the medium to be measured flows and which is preferably made from a ceramic material or thin steel, and a housing comprising a lower shell 5 and an upper shell 25 and receiving the measuring electronics 11 and provided with unions having a flow bore 28 communicating with the tube 2 and which are received by recesses made in facing sides of the lower shell 5 and upper shell 25.

The union 1 comprises an outer part 22, an inner part 23 and a central piece 6. The inner part 23 of both unions 1 is provided with a blind hole 8 concentric to the flow bore 28 and in which are elastically mounted the ends of the tube. With respect thereto a circumferential groove is made in the wall of the hole 8 and in it is located a first O-ring 3 sealing against the tube 2. The mounting of the tube via the O-ring 3 in the hole 8, which is slightly larger than the external diameter of the tube 2, ensures that a twisting or bending of the housing formed by the shells 5, 25 is not transmitted to the tube. The latter is always located in self-centring, unloaded manner in the hole 8, whilst maintaining a small clearance between the tube 2 and the hole 8.

In this embodiment the outer part 22 of the union 1 and the areas of the facing sides of the lower shell 5 and upper shell 25 receiving the same are not cylindrical, so that the unions 1 cannot twist relative to the housing formed by the upper shell 25 and lower shell 5.

The central piece 6 is constructed cylindrically with a reduced diameter compared with parts 22, 23 of the union and the lower shell 5 and upper shell 25 are in each case provided with a semicylindrical portion 17 receiving the central piece 6 of the union 1. At least one second O-ring 30 sealing against the central piece of the union 1 is made in portion 17 of the recesses.

When the unions 1 are made from plastic, the inner part of the unions 1 is in each case embraced by a shape-stabilizing, metal ring 4.

Through the inner part 23 of the union 1 is introduced a pin 31, which prevents turning and which engages in the wall of the lower shell 5 or cover 25 (the provision of such a pin is an alternative to the non-cylindrical construction of one of the parts 22, 23 of the union 1 and the shells 5, 25).

An electric socket 12 is inserted in the semicylindrical depressions in the side walls of the shells 5, 25 and connected by a line 19 to the measuring electronics 11.

In the embodiment shown in fig. 2 the unions are inserted in side parts of the shells 5, 25 instead of in end faces. The inner parts 23 of the unions 1 of the areas of the shells 5, 25 receiving the same are constructed with a complimentary projection 16.

In this embodiment the electronic components 21, which cooperate with functional elements 9 mounted on the tube 2, are fitted to a printed circuit board 20 and connected by a line 19 to the socket 12. A plug 13 is placed via tongues 15 in grooves of a recess in shells 5, 25. In the embodiment shown the plug 13 retains the printed circuit board by a resin filling 27 and is provided with indicating elements 14 detectable from the outside.

The socket 12 is provided with an outer part 24, which rests in complimentary-constructed projections in shells 5, 25 and is in this way prevented from turning.

REFERENCE NUMERALS LIST

1	Union
2	Tube
3	O-ring
4	Ring
5	Lower shell
6	Central piece
7	Hexagon (in 1)
8	Hole
9/10	Measuring element
11	Measuring electronics
12	Socket
13	Plug
14	Indicating elements
15	Tongue
16	Projection
17	Recess
18	Clearance
19	Line
20	Printed circuit board
21	Component
22	Outer part (of 1)
23	Inner part (of 1)
24	Outer part (of 12)
25	Upper shell
26	O-ring
27	Resin filling
28	Flow bore
30	O-ring